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Abstract

A general psychopathology factor reflects an underlying liability for a wide range of mental disorders. There is suggestive evidence that borderline personality disorder (BPD) may be strongly associated with the general psychopathology factor, but there are no detailed data on the degree of overlap between the general psychopathology factor and BPD or its individual symptoms. This study examined the overlap between the general psychopathology factor and BPD using cross-sectional survey data from two nationally representative samples of US adults, the National Comorbidity Survey Replication (NCS-R, N=5692) and National Comorbidity Survey follow-up (NCS-2, N=5001). Structural equation modeling was used to fit a bifactor general psychopathology model and to examine the general psychopathology factor's associations with 1) a series of Cluster A, B, and C personality disorder symptoms including BPD symptoms and 2) a latent BPD. Results showed that the shared variance between the general psychopathology factor and a latent BPD was 56% in NCS-R and 71% in NCS-2. The correlation between the general factor and BPD could be set to unity without worsening model fit, suggesting that BPD closely reflects a general liability to psychopathology. The affective features of BPD were particularly strongly associated with the general psychopathology factor. Findings are discussed with respect to the nosology of BPD and the treatment of mental disorders.

Keywords: general psychopathology factor, borderline personality disorder

Emerging evidence suggests that the structure of psychopathology can be characterized as a hierarchical bifactor model that consists of a higher-order general psychopathology factor and specific internalizing and externalizing factors that represent variance not explained by the general factor (Caspi et al., 2014; Lahey, Krueger, Rathouz, Waldman, & Zald, 2017). The general psychopathology factor – or the "p factor" – accounts for much of the comorbidity of common mental disorders and reflects a latent liability for all forms of psychopathology. Its existence has been supported in epidemiological, genetic, and neurobiological data (Eaton, Rodriguez-Seijas, Carragher, & Krueger, 2015; Pettersson, Larsson, & Lichtenstein, 2016; Riem et al., 2019; Selzam, Coleman, Caspi, Moffitt, & Plomin, 2018), and considerable evidence shows that it is associated with persistence, symptom severity, and life impairment of mental disorders (Caspi et al., 2014; Caspi & Moffitt, 2018; Lahey et al., 2012) .

Similar to the general psychopathology factor, research has also identified a general factor of personality disorders that accounts for the comorbidity between different personality disorders. The general personality disorder factor appears to align itself particularly with borderline personality disorder (BPD) (Sharp et al., 2015; Wright, Hopwood, Skodol, & Morey, 2016), which is a severe psychiatric condition characterized by instability in affect regulation, impulse control, interpersonal relationships, and in self-image (Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004). The general personality disorder factor and the general psychopathology factor are strongly correlated (Oltmanns, Smith, Oltmanns, & Widiger, 2018; Rosenström et al., 2019). One interpretation for this finding is that BPD reflects a broad liability to all forms of psychopathology, that is, the general factor of psychopathology. This would be consistent with the observed high rates of comorbidity between BPD and other disorders across the internalizing and externalizing spectra (Eaton et al., 2011; James & Taylor, 2008; Lenzenweger, Lane, Loranger, & Kessler, 2007).

The association between the general psychopathology factor and BPD is also implied by their shared correlates and features. They are both characterized by high trait Neuroticism and low

Agreeableness and Conscientiousness (Caspi et al., 2014; Saulsman & Page, 2004). Furthermore, emotional dysregulation and problems with impulse control (e.g., suicidality) are considered as the core of both the general psychopathology factor and BPD (Carver, Johnson, & Timpano, 2017; Caspi et al., 2014; Haltigan et al., 2018; Hoerte et al., 2015; Lieb et al., 2004). Such shared features have recently led to a proposal that the general psychopathology factor and BPD should be primarily regarded as indicators for absence of resilience, that is, lack of capacity to withstand adversity (Fonagy, Luyten, Allison, & Campbell, 2017).

However, the degree of overlap between the general psychopathology factor and BPD remains to be empirically investigated. The conceptualization of BPD as a distinct personality disorder has been a source of controversy in recent psychiatric research (Mulder & Tyrer, 2018; Tyrer, 2009; Zandersen, Henriksen, & Parnas, 2018). Determining the degree of overlap between the general psychopathology factor and BPD may thus offer important insights into the dimensional reconceptualization of borderline pathology. Furthermore, if BPD has considerable overlap with the general psychopathology factor, it could provide a window to the general factor's core etiological mechanisms. Because BPD encompasses diverse symptoms across affective, cognitive, behavioral, and interpersonal domains (Lieb et al., 2004), both a symptom-level and a dimensional approach are warranted for a comprehensive examination of BPD's association with the general psychopathology factor.

The current study examined the association between the general psychopathology factor and BPD across two nationally representative surveys of US adults, the National Comorbidity Survey Replication (NCS-R) and National Comorbidity Survey follow-up (NCS-2; independent of NCS-R, not its follow up). We first explored the associations between the general psychopathology factor and a host of personality disorder symptoms to assess if particularly symptoms tapping BPD were associated with general psychopathology, as would be expected from previous research. Then, we estimated the overlap (i.e., shared variance) between the general psychopathology factor and a latent BPD.

Methods

The samples

The NCS-R and NCS-2 are nationally representative surveys of the incidence and prevalence of DSM-IV mental disorders among US adults carried out between 2001 and 2003. The NCS-R was administered in 2 parts. All respondents (N=9282) were administered a part 1 core diagnostic interview. A subset of respondents who met lifetime criteria for any core disorder and a probability subsample of other respondents also received a part 2 interview. Part 2, which was used in the current study (n=5692, 53% female, mean age 45.01 years (SD=17.90)), included questions about other disorders, such as personality disorders. The NCS-2 is a follow-up survey of respondents in the baseline NCS re-interviewed a decade after the initial assessment (N=5001, 50% female, mean age 44.18 years (SD=10.62)). The datasets included sampling weights to account for differential probabilities of selection and participation. Further information about the NCS surveys is presented elsewhere (Kessler et al., 2004; Kessler & Merikangas, 2004).

Measures

Mental disorders were assessed using the WHO Composite International Diagnostic Interview (CIDI) (Kessler & Ustün, 2004), which generates diagnoses according to the DSM-IV criteria. The 17 lifetime diagnoses considered in this study include agoraphobia without panic disorder, panic disorder, social phobia, specific phobia, dysthymia, generalized anxiety disorder, major depression, post-traumatic stress disorder, adult separation anxiety disorder, bipolar I or II disorder, attention deficit disorder, conduct disorder, intermittent explosive disorder, oppositional defiant disorder, alcohol abuse (with or without dependence), drug abuse (with or without dependence), and nicotine dependence. Respondents also completed a series of personality disorder (PD) screening questions (rated true/false) from the International Personality Disorders Examination (IPDE) (Lenzenweger et al., 2007; Loranger, 1999). The screener was administered to generate diagnoses for any Cluster A, any Cluster B, and any

Cluster C PDs as well as for antisocial PD and BPD. The screener covered all diagnostic criteria for BPD except self-harm or suicidal behavior. The NCS-R included a separate question about suicidality ("Have you ever seriously thought about committing suicide?") which was included as a BPD criterion in the current study. The IPDE questions have been found to be significant predictors of clinical diagnoses of personality disorders (Lenzenweger et al., 2007).

Statistical Analysis

The analyses were conducted in three steps using structural equation modeling and were based on sampling-weighted data. First, bifactor measurement models for the latent structure of psychopathology were fitted using confirmatory factor analysis. The bifactor models included one general psychopathology factor and two or three specific factors, depending on the dataset used. Second, the associations between PD symptoms and the general psychopathology factor were estimated. A separate structural equation model was fitted for each PD symptom so that in every model, a single PD symptom loaded onto the general factor. In step three, the shared variance (squared correlation) between the general factor and a latent BPD variable was examined. Although the main focus was on BPD's association with the general factor, we also estimated BPD's associations with the specific factors of the bifactor model. As a sensitivity analysis, step three was repeated, this time using a BPD symptom sum score (as a categorical variable). For steps two and three, the bifactor model loadings were fixed at the estimates obtained in the first step of the analysis to ensure that adding new variables to the model did not change the meaning of the latent psychopathology factors. All models were estimated using Mplus version 7 (Muthén & Muthén, 2012) with mean- and variance-adjusted weighted least squares estimation.

Results

The weighted lifetime prevalence of DSM-IV disorders, the prevalence of BPD symptoms, and the distribution of the total number of BPD symptoms endorsed are presented in Supplementary

material (**eTable 1** and **eFigure 1**). The prevalence of DSM-IV disorders was of similar magnitude among NCS-R and NCS-2 respondents, except for alcohol abuse and drug abuse, which were more prevalent in NCS-2. Around half of the respondents did not endorse any BPD symptoms.

The bifactor model showed good fit in both datasets. All disorders had a significant, positive loading onto the general factor (mean loading 0.55, range 0.35 to 0.82 for NCS-R; mean loading 0.54, range 0.27 to 0.76 for NCS-2). In NCS-R, externalizing disorders loaded more heavily on the general factor than internalizing disorders, whereas an opposite pattern of loadings was observed in the NCS-2. Nonetheless, the general factor was well defined in both datasets. Detailed results of the bifactor analysis are provided in the Supplementary material (**eFigure 2, eTables 2** and **3**).

As expected, the majority of BPD symptoms were more strongly associated with the general factor than symptoms of other PDs (**Figure 1**). This pattern of associations was observed in both datasets but was more pronounced in the NCS-2. Particularly the affective BPD symptoms "Often feel empty inside" and "Very moody" were closely associated with the general factor (correlations (*r*) ranging from .66 to .78).

There was considerable overlap (**Figure 2**) between the general psychopathology factor and the latent BPD (for loadings of the latent BPD, see **eTable 4**).The shared variance between the general factor and the BPD was 56% in NCS-R (r=0.75, 95% CI 0.70 to 0.80) and 71% in NCS-2 (r=0.84, 95% CI 0.78 to 0.91). The shared variance between the specific psychopathology factors and BPD ranged from 0% to 12%. Similar, although slightly weaker results were obtained when the analyses were repeated using a BPD symptom sum score. In symptom sum score analyses, the shared variance between the general factor and BPD was 45% in NCS-R (r=0.67, 95% CI 0.63 to 0.72) and 58% in NCS-2 (r=0.76, 95% CI 0.75 to 0.81).

To further examine if the general psychopathology factor and BPD are the same or distinct constructs, we compared the fit of models in which the correlation between the general factor and the

latent BPD was freely estimated versus constrained to 1. We used the difference in CFI (ΔCFI) rather than the chi-square test which is highly sensitive for large sample sizes (Chen, 2007; Cheung & Rensvold, 2002; Kline, 2016) to assess the statistical difference in model fit between the superordinate model and the nested, more constrained model. Current conventions suggest that a ΔCFI of ≤.01 indicates that the models do not differ in terms of fit (Cheung & Rensvold, 2002). Constraining the correlation to 1 did not result in a significant reduction in model fit (ΔCFI=0.008 in NCS-R; ΔCFI=0.003 in NCS-2), suggesting that the general psychopathology factor and the latent BPD could be considered a unitary construct rather than two separate entities.

Discussion

We observed considerable overlap between the general psychopathology factor and BPD across two nationally representative surveys of US adults, implying that BPD closely reflects the general liability to psychopathology. The affective features of BPD were particularly strongly associated with the general psychopathology factor.

The overlap between BPD and the general psychopathology factor was large enough to conclude that the two could be considered as a single rather than two distinct constructs. The finding is reasonable considering BPD's high comorbidity with a wide range of common mental disorders (Lenzenweger et al., 2007). BPD is highly prevalent in psychiatric populations (Korzekwa, Dell, Links, Thabane, & Webb, 2008) and it is associated with severe functional impairment (Lieb et al., 2004). Correspondingly, the general psychopathology factor describes comorbidity and symptom severity and predicts significant impairment in many areas of life (Caspi & Moffitt, 2018).

Our findings have implications for both research and practice. Firstly, they contribute to the current debate on the status of BPD as a diagnostic category and challenge the notion of BPD as a distinct personality disorder. Whereas recent work has proposed that BPD may be best understood as a general vulnerability to personality disorders (Sharp et al., 2015), the present results show that BPD

captures a broad liability for all forms of psychopathology. In terms of both theoretical and clinical implications, a dimensional rather than a categorical approach to BPD may thus be the most useful.

Secondly, the present findings shed light on the general psychopathology factor's possible etiological mechanisms and thus provide insights into the causes and treatment of mental disorders. Among the PD symptoms examined, BPD symptoms in general and affective BPD symptoms in particular were strongly associated with the general psychopathology factor. Although the presence of the general psychopathology factor has been consistently reported in various studies, it has remained an elusive latent abstraction with poorly understood functional mechanisms. Based on our results, it seems likely that the affective features of BPD are closely related to the general factor's core etiological mechanisms.

There is, however, another possible interpretation of the current results that should perhaps be acknowledged. Oltmanns et al. (2018) similarly reported very high correlations of the general factor of personality disorder with both the general factor of psychopathology and the general factor of personality. They did not then conclude that these general factors are defined largely by or are equivalent to one particular personality disorder, borderline. On the contrary, they suggested that all three general factors are largely defined by the social and occupational impairments and distress that are secondary to maladaptive personality traits and different forms of psychopathology (e.g., panic and substance use disorder). They suggest that there is unlikely to be a substantive disorder or trait that is common to all of the different disorders and traits. The only basis to align them within one common factor is likely to be the impairments and distress that are secondary to them. This also helps to explain how some traits (e.g., laxness and perfectionism) align in the same direction on the general factor despite concerning behaviors that are conceptually opposite to one another.

Even if future research were to find that the general factors of psychopathology would be formative constructs stemming from impairment and adversity, at this point, we consider it important to

investigate the possibility that they reflect relevant etiologic processes. The reflective interpretation has far-reaching consequences for how we treat psychopathology and build theory on it, and it fits with longitudinal, genetic, and brain-imaging data (Elliott, Romer, Knodt, & Hariri, 2018; Gluschkoff, Jokela, & Rosenström, 2019; Goodkind et al., 2015; McTeague et al., 2017; Neumann et al., 2016; Wang, Gaitsch, Poon, Cox, & Rzhetsky, 2017). A number of findings already speak for the etiologic relevance of BPD and ours merely provide structural considerations that may unify these. For example, BPD is strongly associated with persistent depression (Skodol et al., 2011) and the genetic BPD variance appears to exhaust the shared genetic risk factors of depression and personality disorders in population-based twin samples (Reichborn-Kjennerud et al., 2010). Decreases in BPD symptoms lead to decreases in depressive symptoms, whereas decreases in depressive symptoms lack a similar longitudinal influence on BPD (Gunderson et al., 2004). BPD is also largely considered an antecedent for substance use (Trull et al., 2018), and psychosocial treatment may simultaneously decrease general psychology factor and antisocial traits within-individual, while increasing anxiety (Constantinou et al., 2019). Thus, BPD and the general psychopathology factor can often be dissociated from other psychopathologies in what comes to etiology despite their overlap in prevalence (comorbidity). Herein, we quantified the commonalities between BPD and general psychopathology factor and the results seem to suggest that it would be fruitful to at least study causation and overlap between these constructs. Especially when adopting the reflective hypothesis, but also from the formative viewpoint since both the general psychopathology factor and BPD traits may usefully characterize psychological impairment or ill-being (Musek, 2007; Rosenström et al., 2019).

Overall, our findings raise the possibility that successfully treating the symptoms of BPD might lower an individual's risk of developing other mental disorders later in life. The fundamental role of personality in the development of psychopathology has received growing recognition in psychiatric research (Widiger et al., 2019). It has been proposed, for example, that pathological or maladaptive

personality dispositions, rather than mental disorders, should become the focus of psychiatric interventions (Cuijpers et al., 2010). Further research efforts should be directed to explore particularly the role of emotional problems (i.e., affective dysregulation) in the treatment of mental illness. Affective symptoms represent some of the most persistent, trait-like aspects of the BPD (McGlashan et al., 2005) and they have been shown to drive the other BPD symptoms (Tragesser, Solhan, Schwartz-Mette, & Trull, 2007). Moreover, recent evidence suggests that affective dysregulation is a broad transdiagnostic risk factor underlying several psychiatric disorders (Santangelo et al., 2016), which also parallels with the results of the current study. Affective dysregulation refers to an array of difficulties in the emotional domain, including an inability to recognize emotions, heightened emotional sensitivity, and intense emotional reactivity. Such emotional problems impede the capacity to benefit from the social environment and are thus associated with increased vulnerability and lack of resilience to life stressors (Fonagy et al., 2017).

This study has a number of limitations. First, BPD was assessed with screening questions instead of a structured clinical interview. However, it is noteworthy that such screening items alone produced significant associations with the general psychopathology factor. This is line with previous research showing that even subclinical manifestations of BPD are associated with negative outcomes such as functional impairment (Zimmerman, Chelminski, Young, Dalrymple, & Martinez, 2012). Secondly, because the screening questions did not include complete diagnostic criteria for all PDs, we could examine BPD symptom associations with the general psychopathology factor only in comparison to a rather limited set of cluster A, B, and C personality pathology symptoms. Future studies with a complete set of PD criteria are needed to establish whether BPD is more strongly associated with the general factor than other PDs. Finally, although the general factor was well defined in both the samples, its meaning (i.e., the pattern of factor loadings) was not entirely comparable across the

datasets. Despite the discrepancy, the association between BPD and the general factor was rather consistent across the datasets, supporting the robustness of our findings.

Conclusions

There is considerable overlap between the general psychopathology factor and BPD, which indicates that BPD reflects a general liability to all forms of psychopathology. Particularly the affective features of BPD tap into the general psychopathology factor, supporting the notion that affective dysregulation is involved in the etiology and maintenance of many forms of psychopathology.

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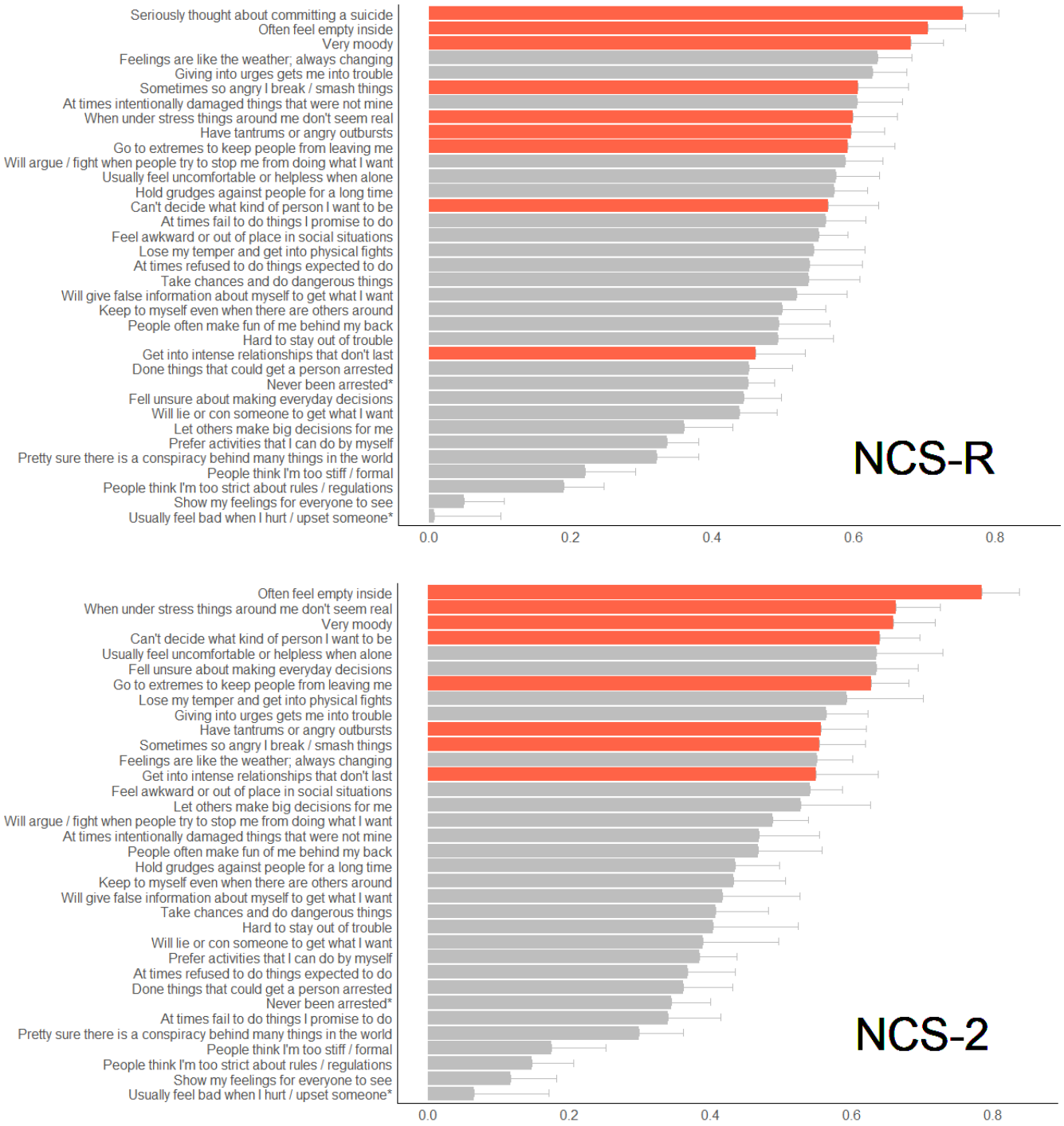

Figure 1. The associations of personality disorder symptoms (and suicidality, in NCS-R) with the general psychopathology factor as standardized factor loadings (i.e., correlations). Items reflecting borderline personality disorder are highlighted. *reverse coded item. Error bars show upper 95% confidence intervals.

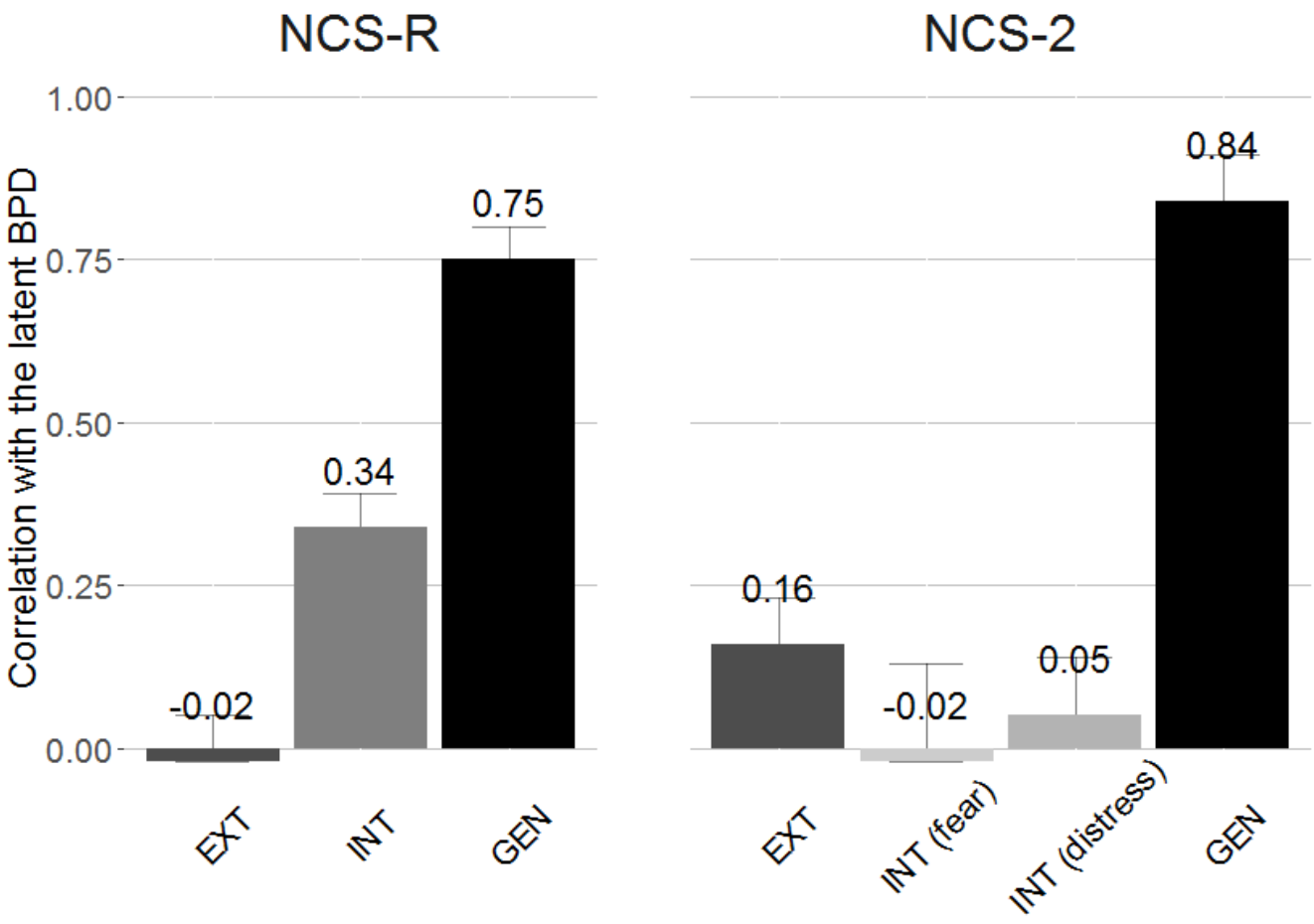

Figure 2. The general and specific psychopathology factors' correlations with the latent borderline personality disorder. Error bars show upper 95% confidence intervals.